MAINTENANCE MANUAL

PD BENCH/FLOOR SCALE SERIES

MODELS: PD-B-30, PD-B-75, PD-B-150
PD-F-75, PD-F-150, PD-F-300
PD-L-150, PD-L-300, PD-L-600
PD-XL-150, PD-XL-300, PD-XL-600

CONTENTS

MARCH 2004

Specifications and Function Subject to Change without Notice

1. INTRODUCTION

This maintenance manual contains of certain information that may result in fraudulent use. Do not release any part of this manual to any end users or un-authorized persons.

The internal DIP S/W should be so set to prevent un-authorized settings or alternations.

Should a load cell has been replaced, make sure that the protection devices are properly set.

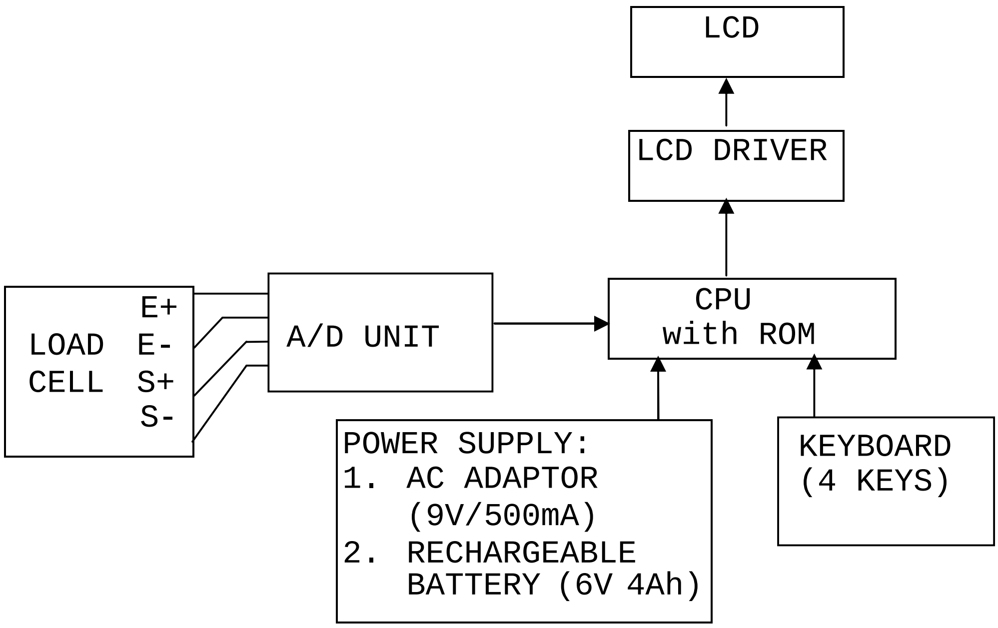
After servicing, it is necessary to go through all tests and procedures to ensure the scale meets all the meteorological and approval requirements.

Here are some features of the PD series

1. Zero indicator
2. Tare indicator
3. Negative value indicator
4. Subtractive tare function
5. Power on zero function
6. Manual zero function
7. Auto Power Saving Function
8. Multi Weight Unit Selectable
9. 5 x 21mm wide angle LCD digits
10. Dual power: - By built-in rechargeable battery and external AC/DC power adaptor
11. Low battery warning signal
12. Dual color charge status indicator
13. 2 Types of Calibration
14. Overload protection devices against excessive load or shock applied
15. AC/DC power adaptor and dust cover included
16. Dip Switch to prevent end-user calibration
17. Optional EL backlight and Rechargeable Power Pack

2. SPECIFICATION

2.1 SYSTEM BLOCK DIAGRAM

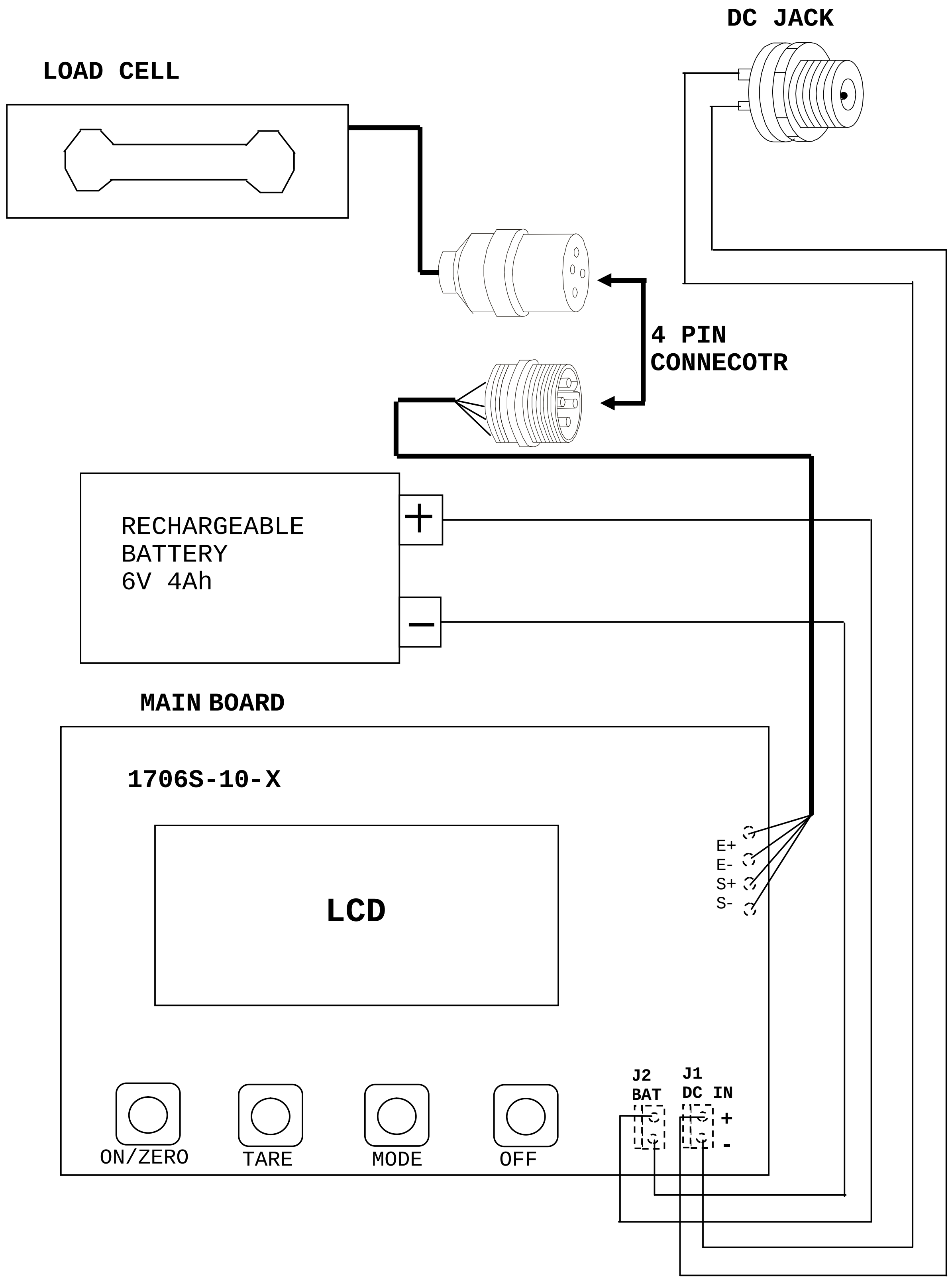


Description:
When an article is placed on the platter, the load of the article is applied to the load cell inside the scale.

The resistance to the excitation current in the strain gauge will then changed and the analog output signal varies.

It is amplified and digitized continuously by the A/D converter into a digital signal. Subsequently, the resulting count is processed and managed by the CPU. The CPU refers to the instructions from the keyboard, and then conveys the output data to LCD driver, which formats the data into readout on the display panels.

2.2 PHYSICAL LAYOUT OF ELECTRICAL CONNECTION



2.3 GENERAL SPECIFICATION

Overall View



Overall Dimension:

PD-B 330 X 620 X 750 mm
PD-F 425 X 720 X 850 mm
PD-L 500 X 780 X 850 mm
PD-XL 600 X 970 X 850 mm

2.3.1 Model Specifications

Model Number	PD-B-30	PD-B-75	PD-B-150		
		PD-F-75	PD-F-150	PD-F-300	
			PD-L-150	PD-L-300	PD-L-600
			PD-XL-150	PD-XL-300	PD-XL-600
Capacity	30kg	75kg	150kg	300kg	600kg
External Resolution	0.005kg	0.01kg	0.02kg	0.05kg	0.1kg
Tare Range	Full Tare				
Power on Zero Range	±10%F.S.				
Manual Zero Range	±2%F.S.				
Operation Environment	0°~40°C (32°~104°F), Non-condensed. R.H.≦ 85%				
Power Consumption	Normal = 0.1W Charging = 5W				
Power Source	Built-in Rechargeable Battery, or AC/DC Power Adaptor:DC9V 500mA				

2.3.2 Main Components Used

Microprocessors: 89C52
Crystal Oscillator: 7.3728MHz
Display Device: WTN Liquid Crystal Display
Load Cell Used: 350Ω load cell

Load Cell Capacity:	PD-B-30	= 60kg
	PD-B-75, PD-F-75	= 100kg
	PD-B-150,PD-F-150,PD-L-150, PD-XL-150	= 250kg
	PD-F-300,PD-L-300,PD-XL-300	= 500kg
	PD-L-600,PD-XL-600	= 750kg

2.3.3 Analog Specification

Input sensitivity: 2mV/V

Zero Drift: 0.02% R.O./10 ºC

Zero Balance Range: ±2% of rate capacity

Load Cell Excitation Voltage: DV5V
A/D Conversion Speed: 5 times/second
Internal Resolution: 30000

3. INITIAL SETUP

3.1 INTERNAL FUNCTIONS AND SETTING METHODS

INTERNAL FUNCTION TABLE

Function	Symbol	Description
1	F.1	Span value reading and dealer calibration
2	F.2	Full display segment and max. capacity check
3	F.3	Check offset value and scale configuration
4	F.4	Auto power off setting

HOW TO ENTER THE REQUIRED FUNCTION MODE

a. Turn scale off.
b. Press and hold TARE, then turn scale on. Scale displays F.1
c. Press TARE until the required function number appears.
d. Press MODE
e. Press MODE until the required setting appears.
f. Press TARE to confirm.
g. Repeat step c to f for other function setting, or
h. Press ON/ZERO to save settings and return to normal operation.

F.1 Span Value Reading and Dealer Calibration

a. Simply enter F.1 to read the A/D counts.
b. Press ON/ZERO to clear the A/D counts, apply test mass onto platter, the span value of test mass will be displayed.
c. Refer to ***Dealer Calibration procedures*** for dealer calibration.

F.2 Display Segment and Rated Capacity & Division Check

When function is entered, all segments will be displayed. Check and make sure that no segments are missed.

F.3 Check Offset Value and Scale Configuration

a. Enter F.3, scale displays the Offset value when unloaded.
b. Apply extra load onto platter, the total internal count value will be displayed.

SELECT WEIGHT UNITS

a. Press and hold MODE until the weight unit appears.
b. To employ all (metric and pound) weight units, press MODE until lb appears. To disable pound weight unit, press MODE until kg appears.
c. Press ON/ZERO to save setting and back to normal operation status.

F.4 Auto Power Off Setting

Two modes are available: (Default=4_OFF)
0._OFF = Auto Power Off function is disabled.
4._OFF = Scale will automatically be turned off after 4 minutes

unused.

3.2 AUTO AND DEALER CALIBRATION PROCEDURES

ACCEPTABLE LOAD FOR AUTO AND DEALER CALIBRATION

Model Number	External Division	Acceptable Auto and Dealer Calibration Load	
PD-30	1/6000	*10kg	20kg
PD-75	1/7500	*20kg	50kg
PD-150	1/7500	*50kg	100kg
PD-300	1/6000	*100kg	200kg
PD-600	1/6000	*200kg	400kg

* Recommended calibration load

Dealer Calibration Procedures:

1. Turn scale off.
2. Press and hold TARE, then turn scale on.
3. Scale displays F.1
4. Press MODE
5. Scale displays offset value
6. Press ON/ZERO
7. Press TARE
8. Press ON/ZERO
9. Press TARE
10. Press ON/ZERO, scale displays an arrow at the right hand of the display. It means the scale is ready for dealer calibration. Make sure that the figure being displayed is =0 or 1, If not, press ON/ZERO again.
11. Load calibration either load as listed on above table.
12. When value displayed is stable, press MODE.
13. Wait until the scale starts down count.
14. Calibration completed and scale is ready for operation.

Note: odd weight calibration can be executed during step 11
(Min. calibration weight = 10% of rated capacity)

1. Press MODE for lasting 1 second, scale displays “00000”.
2. Enter calibration weight by pressing:
   ZERO key to increase value
   TARE key to move cursor
3. Press MODE after calibration weight is keyed in.
4. Place calibration weight onto the scale.
5. When value displayed is stable, press MODE.
6. Wait until scale displays DONE and starts down count.
7. The scale is now calibrated and ready for normal operation.

Auto Calibration Procedures:

1. Turn scale off
2. Press and hold MODE, then turn scale on.
3. Scale displays CAL?
4. Press MODE
5. Scale displays LOAD XXXX or XXXX
6. Apply calibration load according to above table.
7. Wait until the scale displays DONE and starts down count.
8. Calibration completed and scale is ready for operation.

Note: odd weight calibration can be executed during step 5
(Min. calibration weight = 10% of rated capacity)

1. Press MODE for lasting 1 second, scale displays “00000”.
2. Enter calibration weight by pressing:
   ZERO key to increase value
   TARE key to move cursor
3. Press MODE after calibration weight is keyed in.
4. Scale displays “YES.. LoAd..XXXX”(XXXX:calibration weight)
5. Place calibration weight as shown on the display.
6. Wait until scale displays DONE and starts down count.
7. The scale is now calibrated and ready for normal operation.

3.3 DISABLE CALIBRATION AND AVOIRDUPOIS WEIGHT UNITS WITH DIP SW. (DIP1)

The DIP SW.#1 is used to control calibration and avoirdupois weight units. Push this switch to ON position to disable calibration.

3.4 OFFSET AND SPAN VALUE DATA

OFFSET AND SPAN VALUE DATA TABLE

Model Number	Offset Value (Thousand)	Span Value(Thousand) at Various Load Applied		Offset Control	Span Control(Ohm) R1A
PD-30	10~14	10~15 at 10kg	20~30 at 20kg	VR1 Trimmer	68K
PD-75	10~14	10~15 at 20kg	25~37.5 at 50kg	VR1 Trimmer	68K
PD-150	10~14	10-15 at 50kg	20-30 at 100kg	VR1 Trimmer	68K
PD-300	10-14	10~15 at 100kg	20~30 at 200kg	VR1 Trimmer	82K
PD-600	10-14	10~15 at 200kg	20~30 at 400kg	VR1 Trimmer	68K

READING OFFSET VALUE

1 Turn scale off
2 Remove all load from platter
3 Enter F.3 and read the offset value

READING SPAN VALUE

1 Turn scale off
2 Remove all load from platter
3 Enter F.1
4 Press ON/ZERO
5 Apply load to platter. Span value according to load applied will be displayed.

HOW TO ADJUST OFFSET VALUE

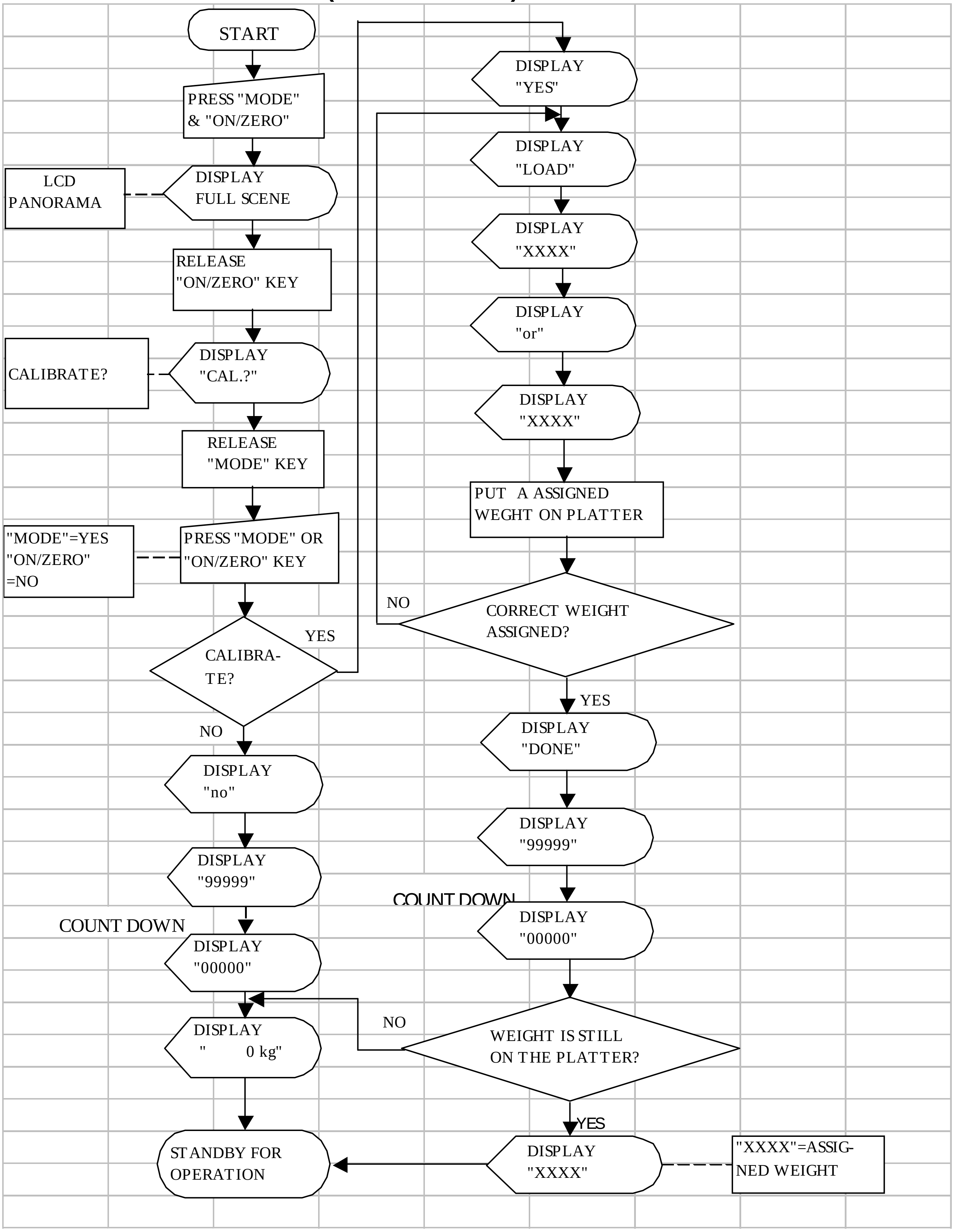
In case the offset value is out of range, adjust the trimmer located at VR1 on the main board to obtain correct offset value.

HOW TO ADJUST SPAN VALUE

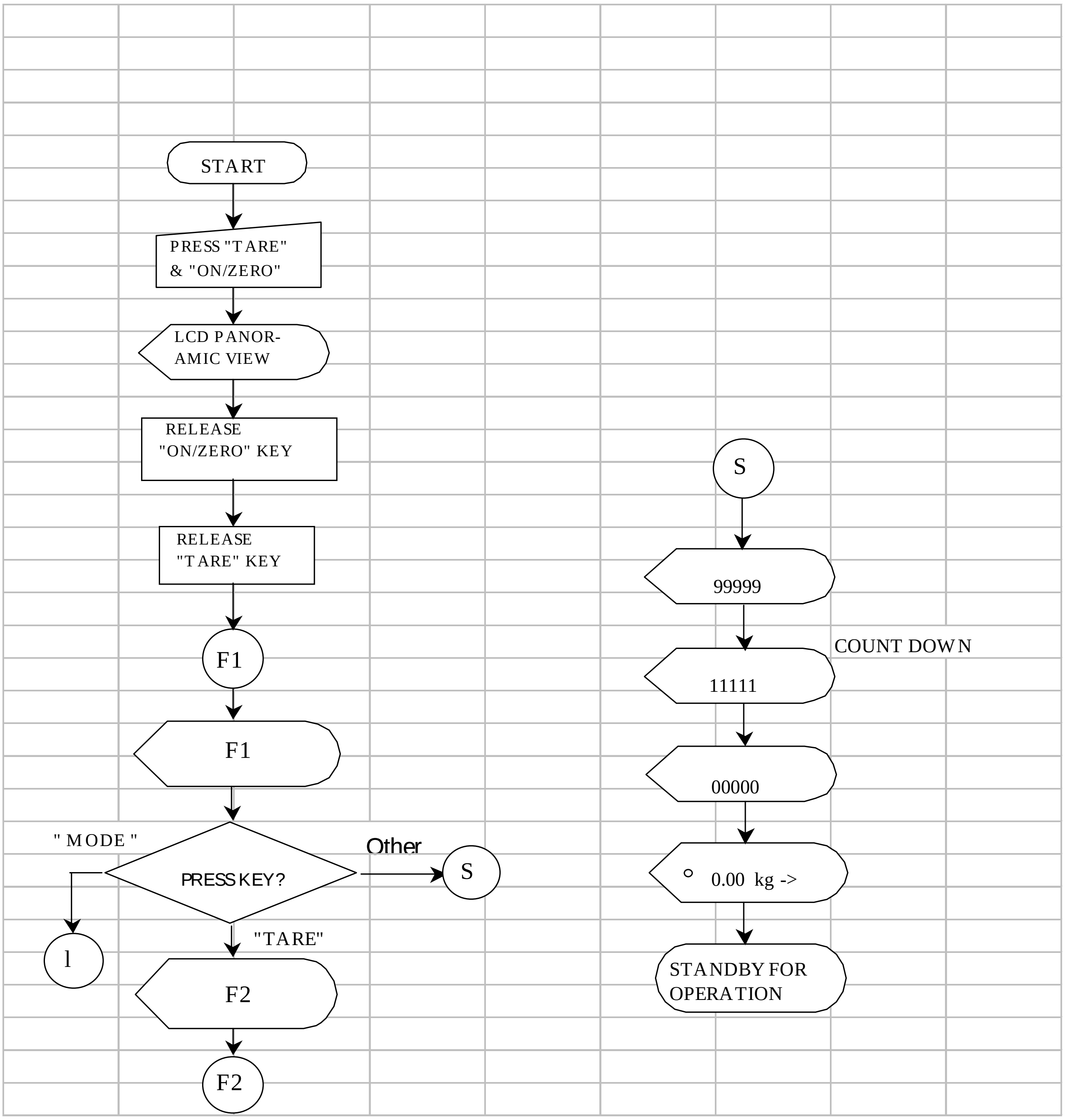
The span value is controlled by resistor located on R1A, standard resistor value of R1A is listed on the above table. If the required span value is not attained, then change R1A resistor according to either case below:
Span value too low: Increase the resistance of R1A.
Span value too high: Decrease the resistance of R1A.

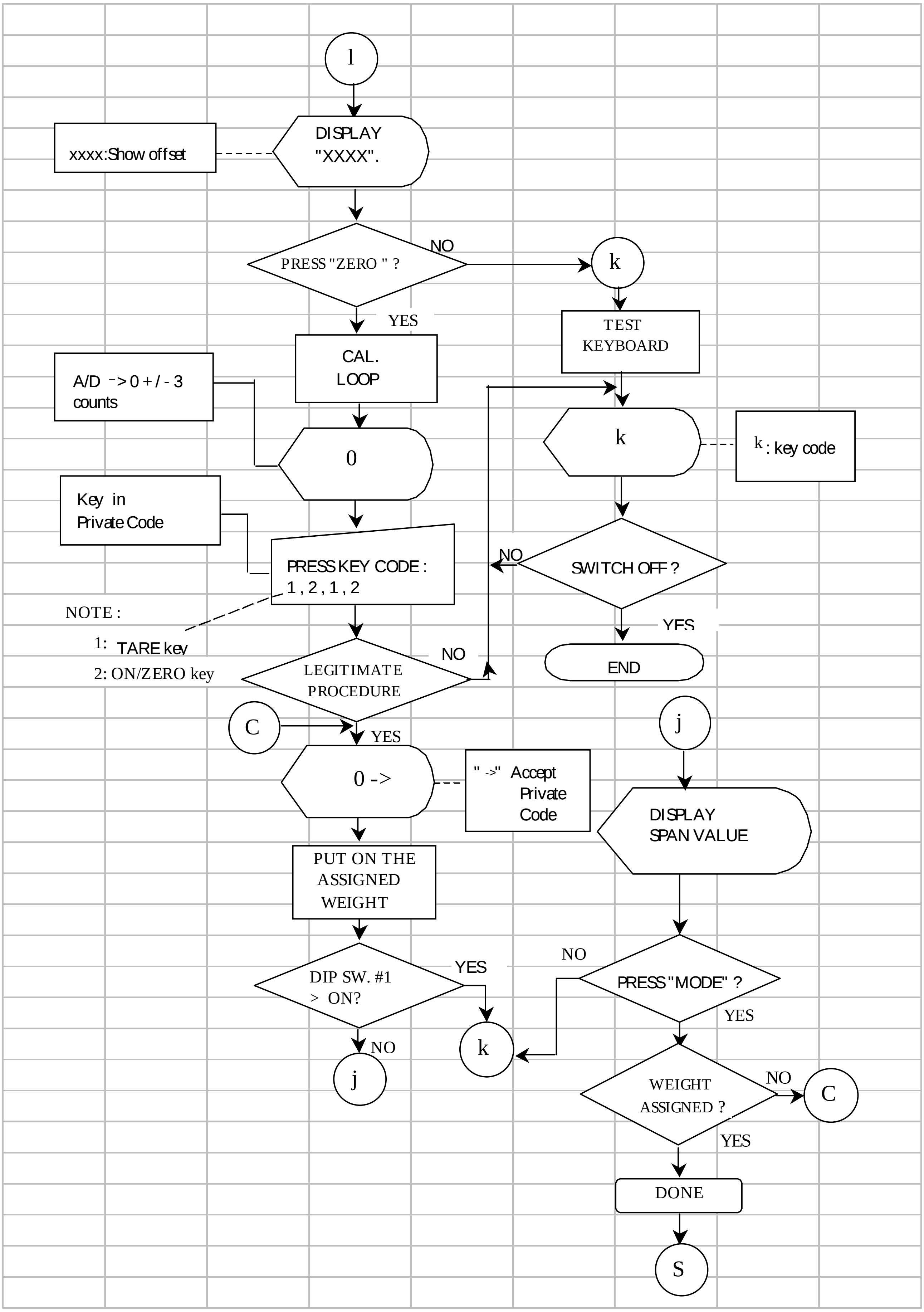
3.5 FLOW CHART

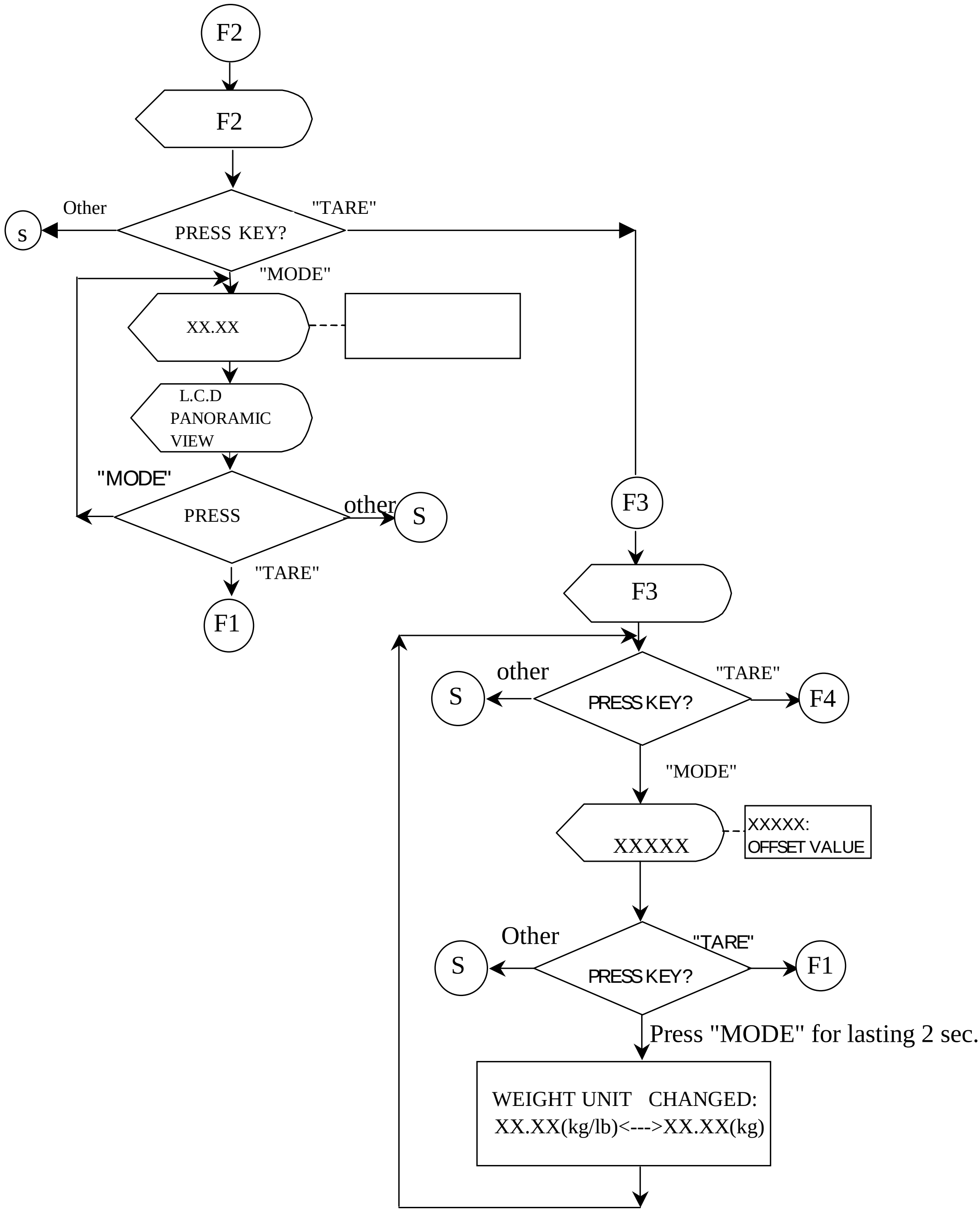
3.5.1 Auto Calibration (for end-user)

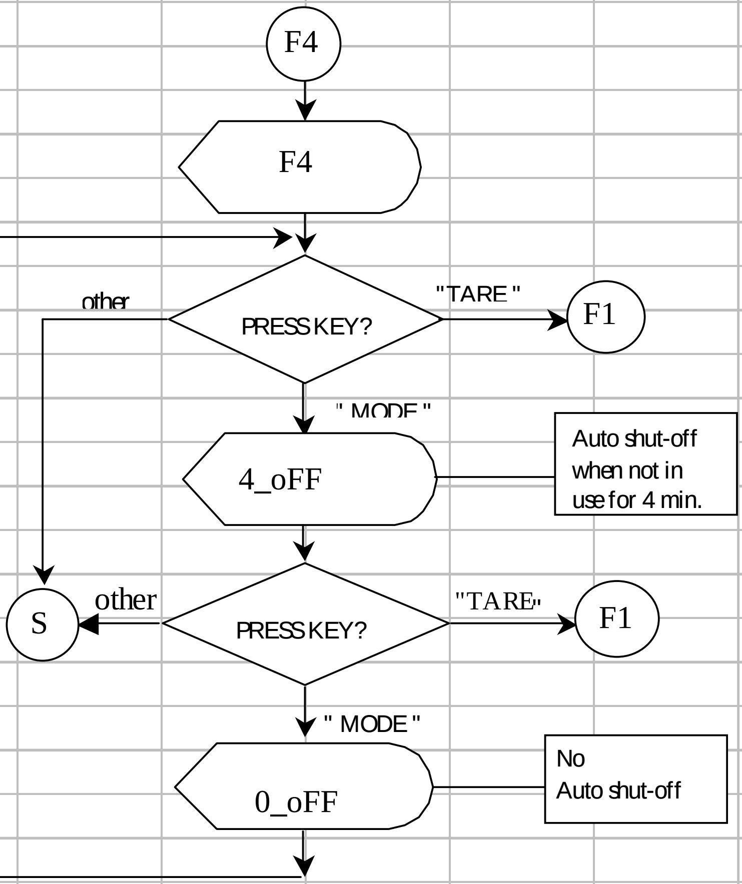


3.5.2 Function Test (for technicians only)



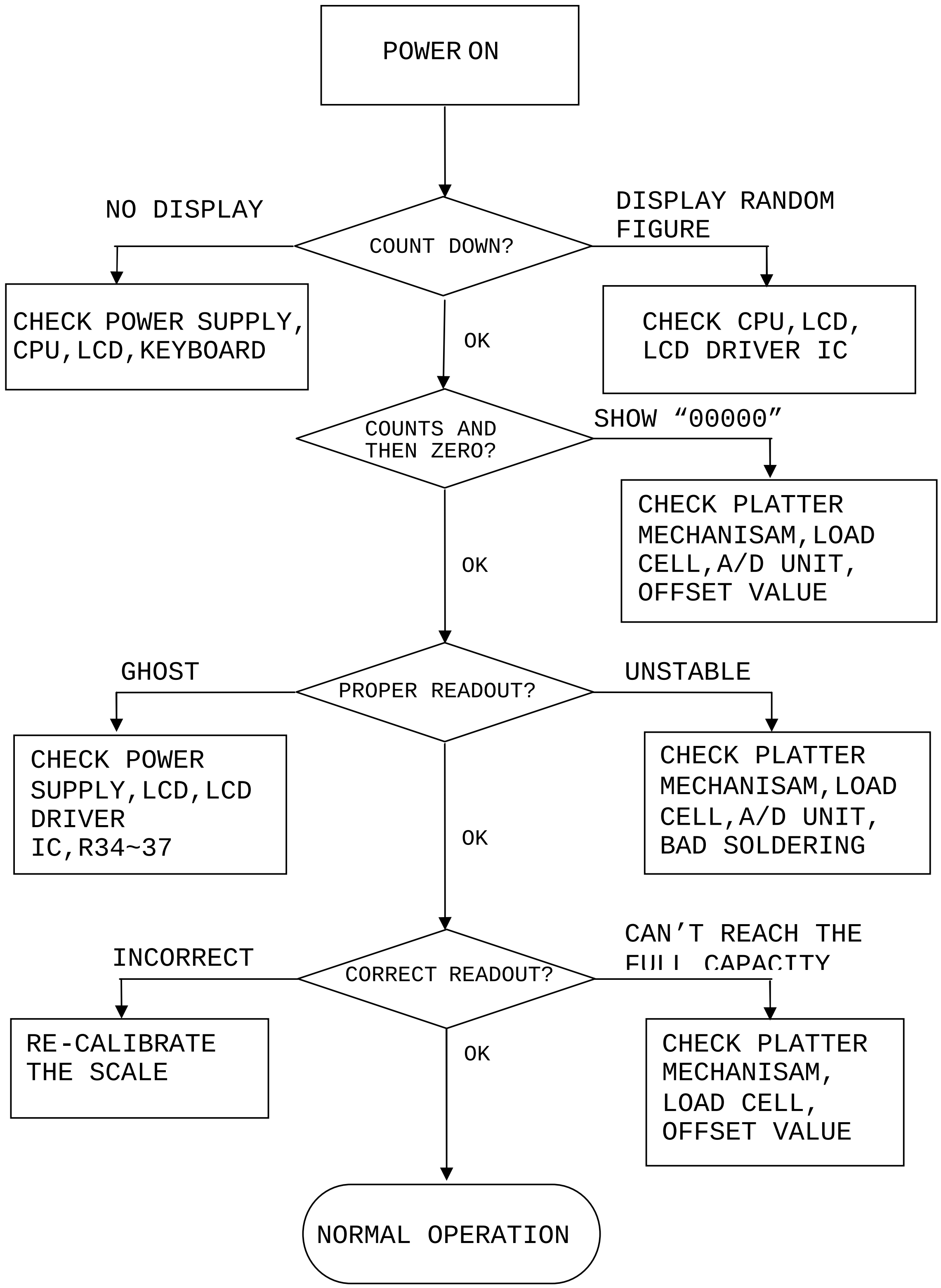

l
DISPLAY "XXXX".
xxxx:Show offset
PRESS "ZERO " ?
NO
YES
k
TEST KEYBOARD
CAL. LOOP
A/D -> 0 + / - 3 counts
0
k
k : key code
Key in Private Code
PRESS KEY CODE : 1 , 2 , 1 , 2
SWITCH OFF ?
NO
YES
END
NOTE :
1: TARE key
2: ON/ZERO key
LEGITIMATE PROCEDURE
NO
C
YES
j
0 ->
" ->" Accept Private Code
DISPLAY SPAN VALUE
PUT ON THE ASSIGNED WEIGHT
DIP SW. #1 > ON?
YES
NO
PRESS "MODE" ?
YES
k
NO
j
WEIGHT ASSIGNED ?
NO
C
YES
DONE
S


F2
F2
Other
"TARE"
s
PRESS KEY?
"MODE"
XX.XX
L.C.D
PANORAMIC
VIEW
"MODE"
PRESS
other
S
"TARE"
F1
F3
F3
other
"TARE"
S
PRESS KEY?
F4
"MODE"
XXXXX
XXXXX:
OFFSET VALUE
Other
"TARE"
S
PRESS KEY?
F1
Press "MODE" for lasting 2 sec.
WEIGHT UNIT CHANGED:
XX.XX(kg/lb)<--->XX.XX(kg)


F4
F4
"TARE"
other
PRESS KEY?
F1
" MODE "
4_oFF
Auto shut-off when not in use for 4 min.
S
other
"TARE"
PRESS KEY?
F1
" MODE "
0_oFF
No Auto shut-off

4. TROUBLE SHOOTING

4.1 TROUBLE SHOOTING LOOP

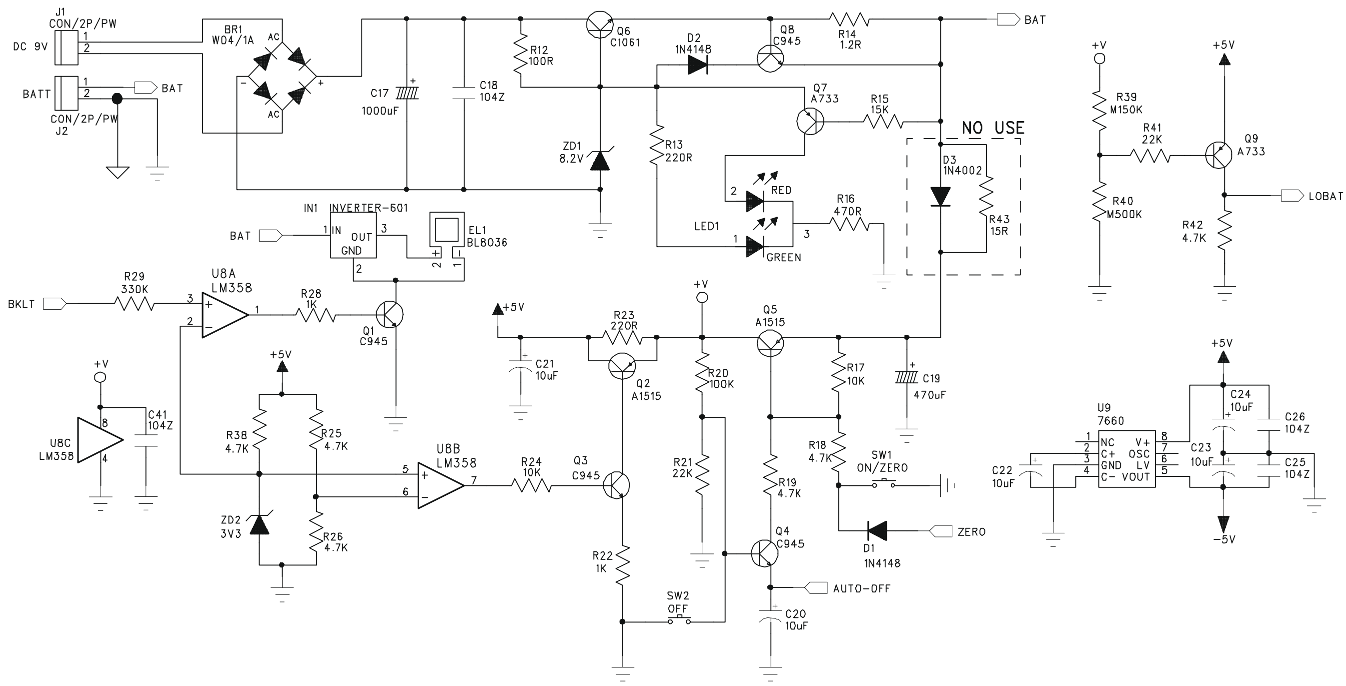


4.2 PARTS AND COMPONENTS TROUBLE SHOOTING

4.2.1 Power Supply Checking

4.2.1.1 Relevant parts:

Main Board (1706S-10-X)
Q6 (C1061)
ZD1 (8.2V)
BR1 (W04/1A)
Q5 (A1515)
Q4 (C945)
Q8 (C945)
R14 (1.2 ohm, 1/2W)
Q9 (A733)
U9(IC 7660)
U8(LM358)
ZD2 (3.3V)
DC JACK(SCD-021)



Description:

1) AC Adaptor: This AC Adaptor provides power for DC9~12V,500mA

2) Battery: Built-in Rechargeable Battery 6V/4Ah

3) How Battery is charged completely?
The charging voltage is regulated by Q6 (C1061) and ZD1 (8.2V) for about 7 volts.

The charging current will go down automatically when voltage reached.
Q8 (C945) and R14 (1.2R, 1/2W) provide Over-Current protection.

4) -5V power drives analog devices(OP. amp. & A/D converter)
U9 (IC 7660) is a -5volts Voltage generator.

5) +5V power drives analog and digital circuit systems.
U8 (LM358) is used to generate 5volts Voltage with negative feed-back technology.

6) Auto-off:
If the scale is set with 4_oFF mode of power saving function or under LO-BAT status, then after fixed time, CPU will release a high potential signal to draw Q4 off, therefore Q1 cuts off, the scale will be shut down immediately.

7) Low Power Detection:
The Q9 (A733) is designed to detect the power level. When battery voltage is less than 5.5V, Collector pole will release a high potential signal to CPU, and then CPU will instruct LCD display to show LO-BAT symbol.

4.2.1.2 Input voltage: 5.5V or higher
Check and recharge battery if voltage less than 5.5V.
Check DC-JACK or AC Adaptor if been defective.

4.2.1.3 System voltage (Vcc): 5V +/- 10%
Check that the system voltage is within 5V +/- 10%
a) less than 4.5V, the CPU may not work properly.
b) more than 6V, ghost will appear on LCD.

4.2.2 Platter Stopper Checking
The platter device shall not touch anything around itself during operation. Check that the platter is not contacted with the upper (no load) and/or lower (with load) stopper.

4.2.3 LCD Display Checking

4.2.3.1 Check that it is soldered and connected properly between LCD and driver IC (uPD7225), driver IC (uPD7225) and CPU.

4.2.3.2 Check whether LCD is broken.

4.2.4 CPU Checking

4.2.4.1 Check that all pins are seated properly into the socket.

4.2.4.2 Check that the Crystal Oscillator works.

4.2.4.3 Check the RESET is normally low.

4.2.5 A/D Unit Checking

4.2.5.1 Check that the +5V & -5V powers are correctly fed to the A/D unit.

4.2.5.2 Check that the signal output of loadcell is adequate.

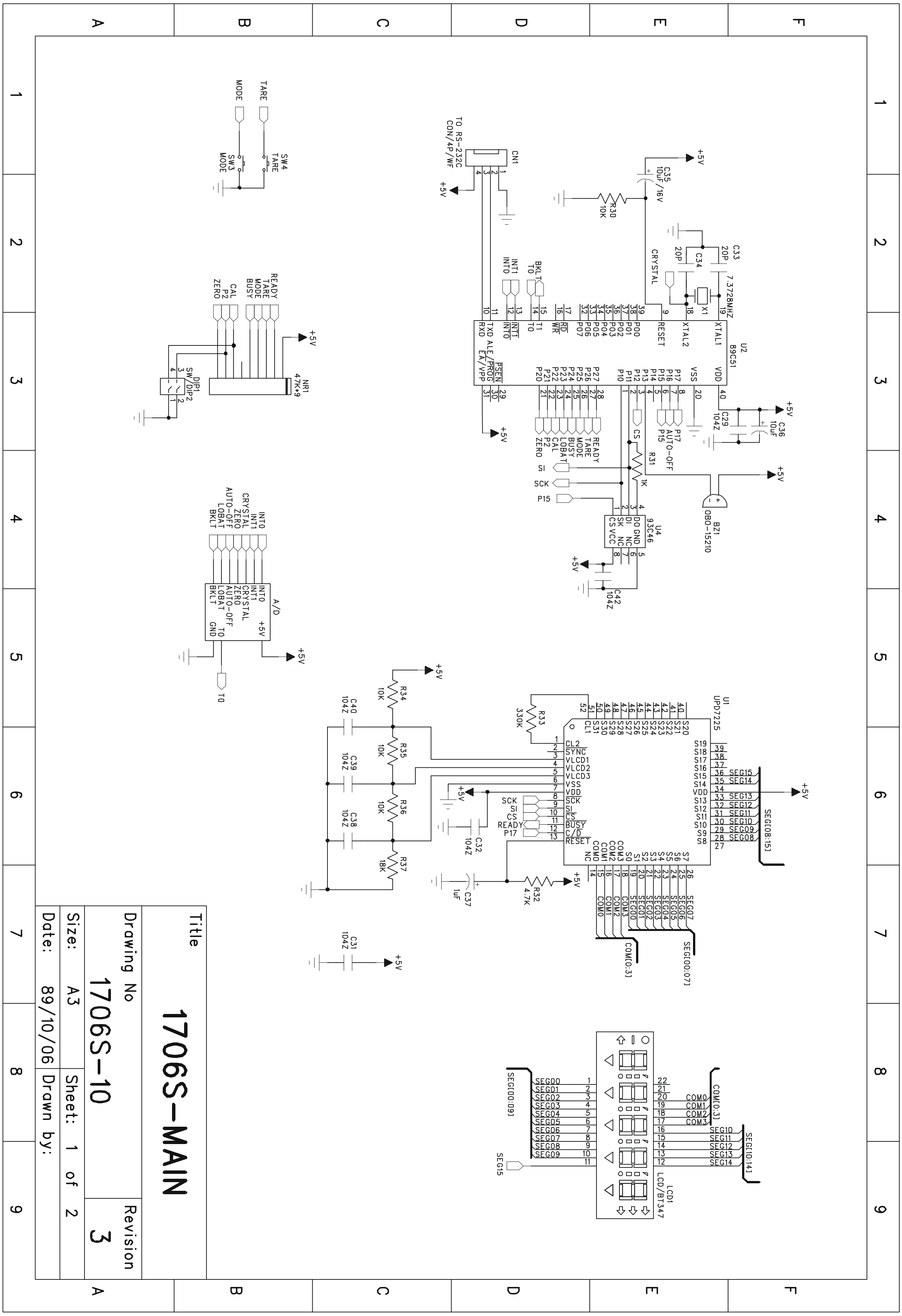
4.2.5.3 Check OP. amplifiers & A/D converter (AD7135).

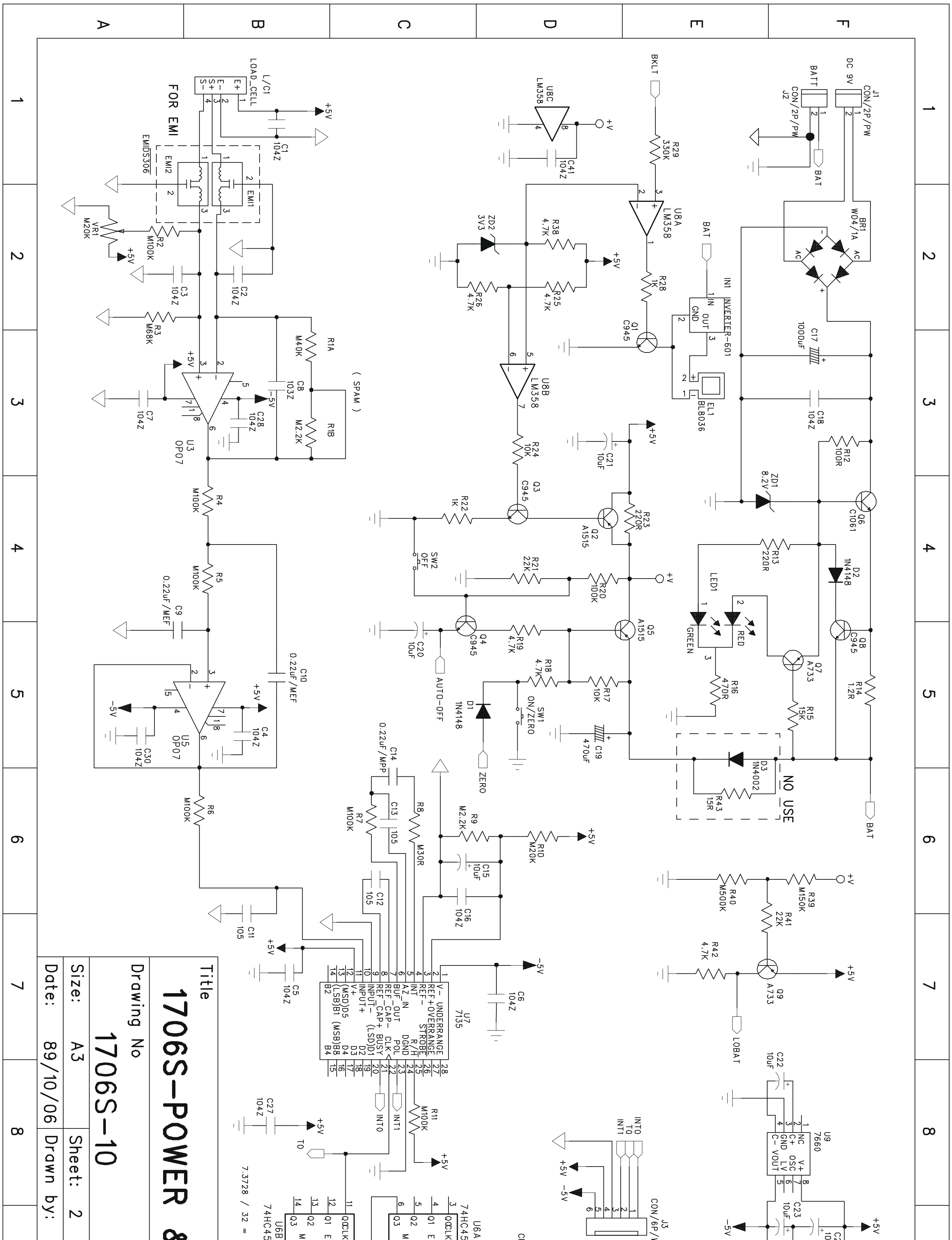
When no error is found with the above checking procedures, the trouble can be caused by the load cell or the PCB itself. Replace a new one could be better to identify the defectiveness.

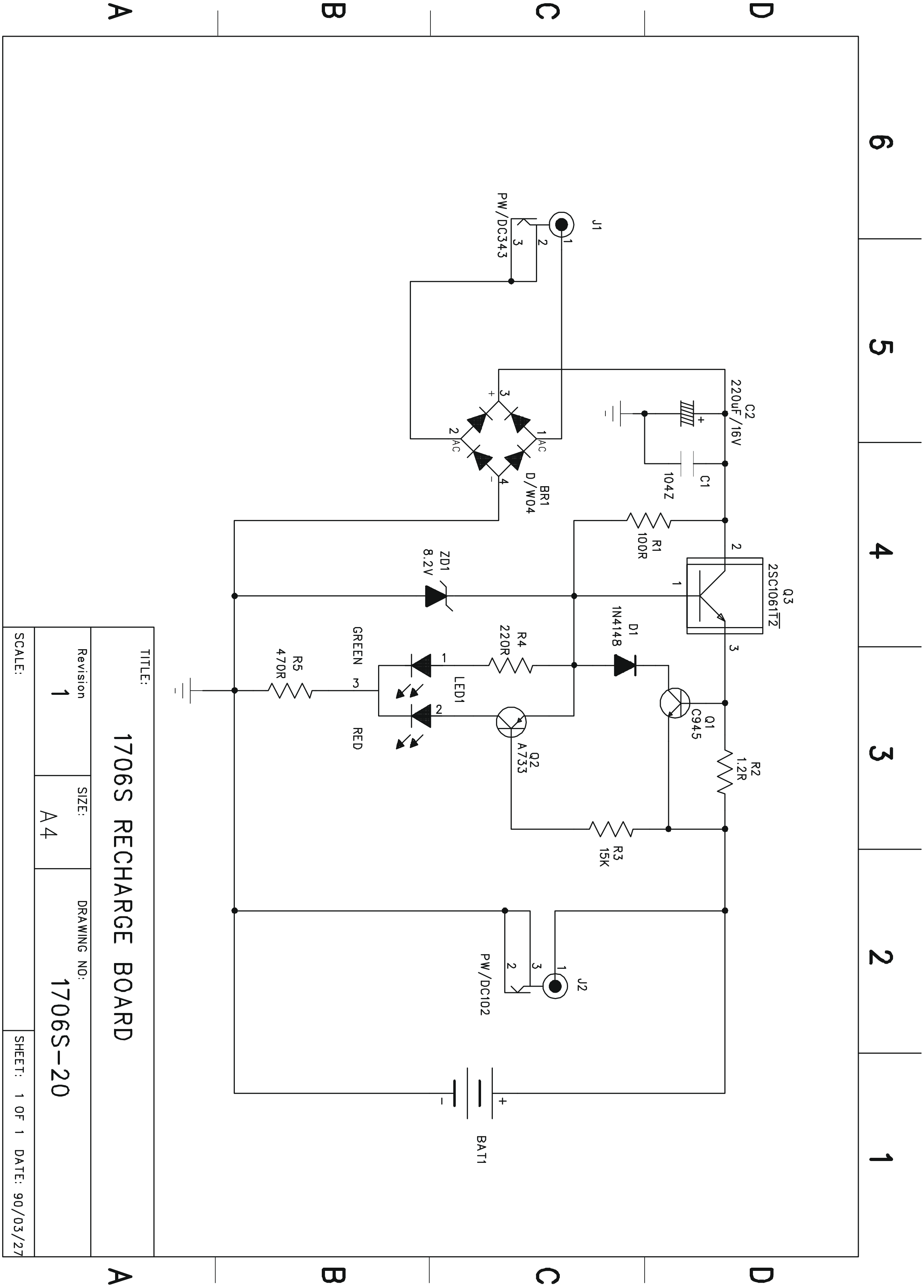
In this way, the readout of weight would be varied because of the output voltage of loadcell and different span value, so re-calibration is necessary after this replacement.

5. ELECTRICAL CIRCUITRY

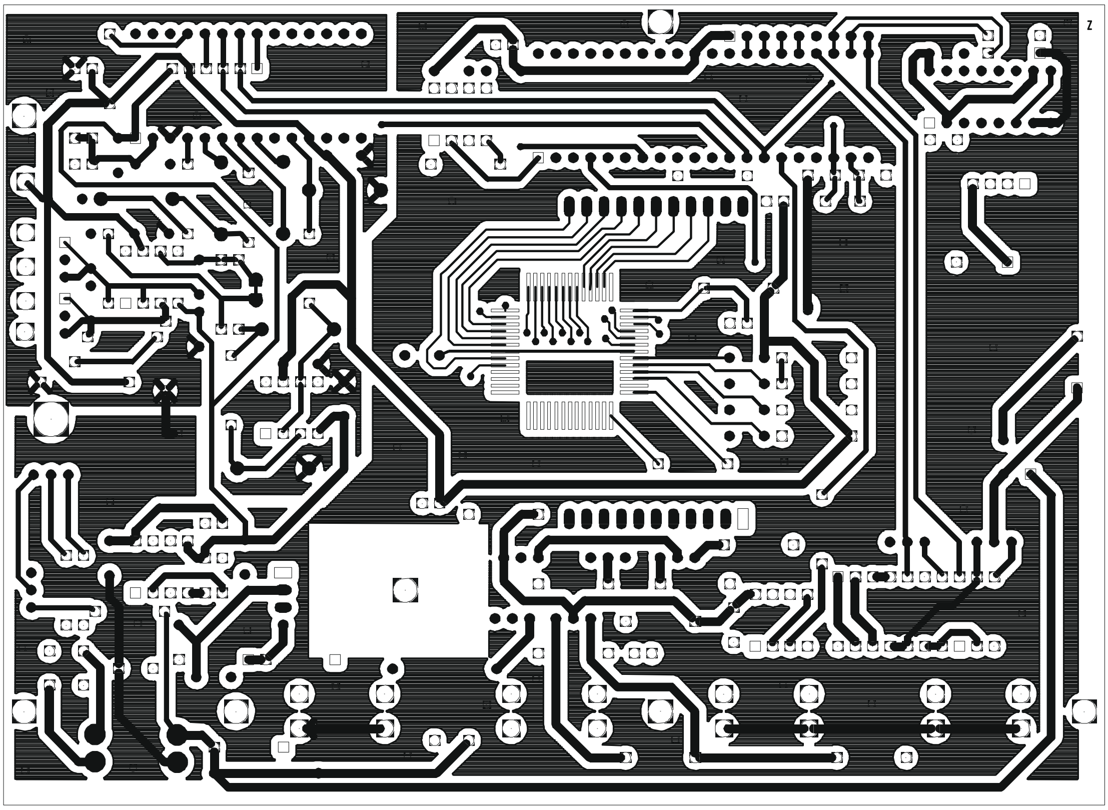
SCHEMATICS



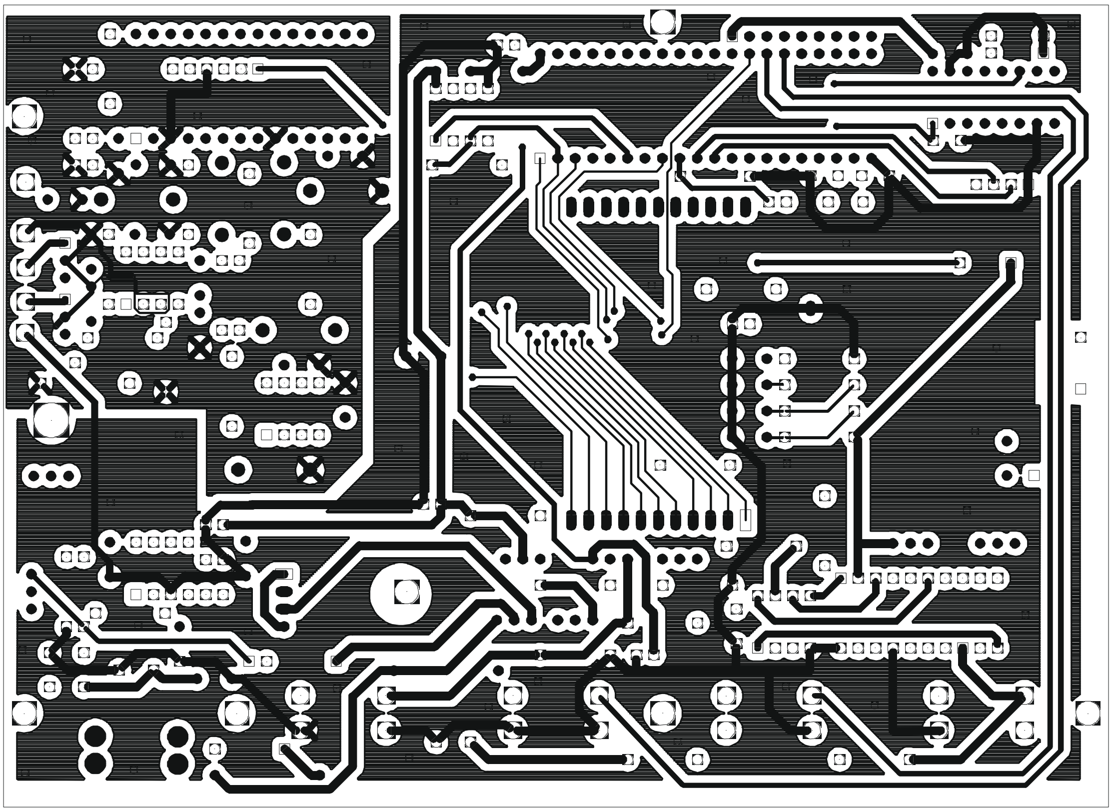

Title
1706S-POWER & A/D
Drawing No
1706S-10
Revision
3
Size: A3
Sheet: 2 of 2
Date: 89/10/06
Drawn by:


TITLE:
1706S RECHARGE BOARD
Revision
1
SIZE:
A4
DRAWING NO:
1706S-20
SCALE:
SHEET: 1 OF 1 DATE: 90/03/27
J1
PW/DC343
BR1
D/W04
C2
220uF/16V
C1
104Z
R1
100R
Q3
2SC1061T2
ZD1
8.2V
D1
1N4148
R4
220R
R5
470R
GREEN
RED
LED1
Q1
C945
Q2
A733
R2
1.2R
R3
15K
J2
PW/DC102
BAT1

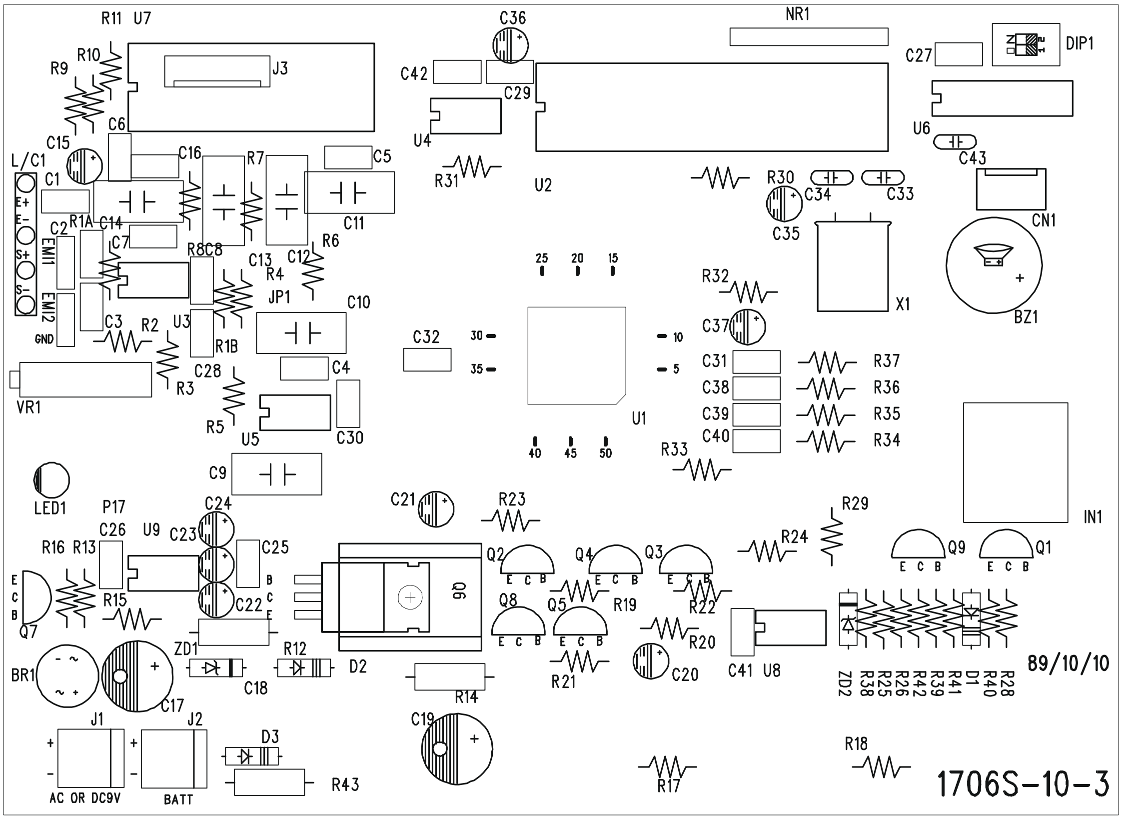
5.2 PCB LAYOUT



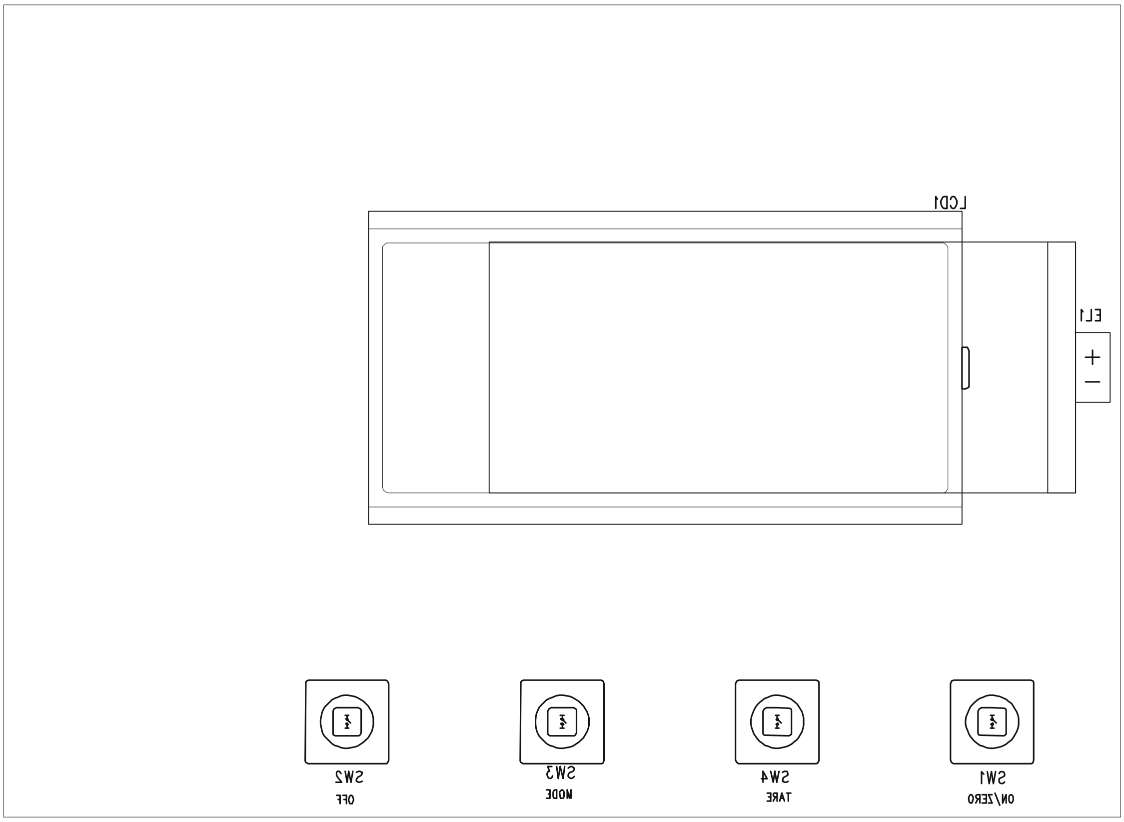
1706S-10-3 TOP LAYER



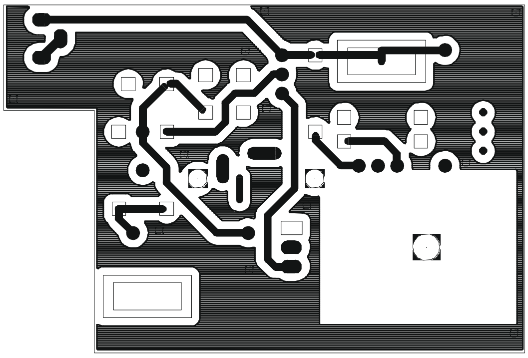
1706S-10-3 BOTTOM LAYER



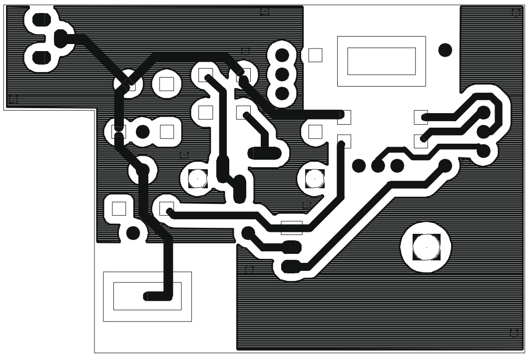
1706S-10-3 TOP OVERLAY



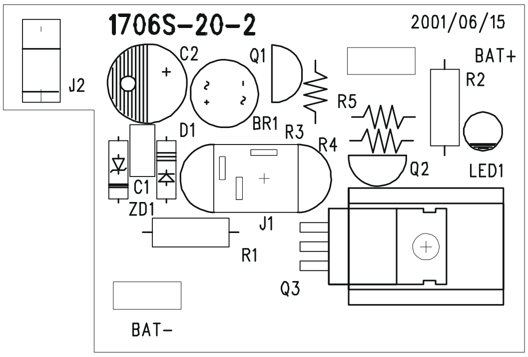
1706S-10-3 BOTTOM OVERLAY



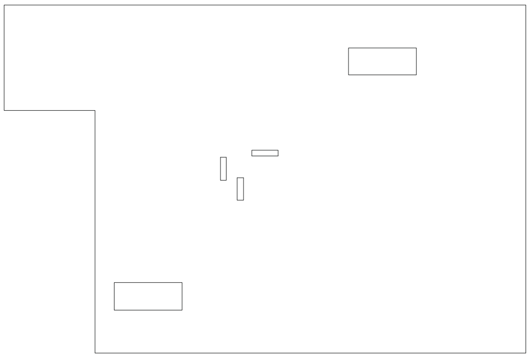
1706S-20-2 TOP LAYER



1706S-20-2 BOTTOM LAYER



1706S-20-2 TOP OVERLAY



1706S-20-2 BOTTOM OVERLAY

6. BILL OF MATERIAL

STRUCTURE
1708S SERIES

Parts No.	Description	Specification	Qty	Remark
E1706000010	P.C.B. KIT	1706S-10-X MAINBOARD	1	
A00********	LOAD CELL		1	
G0001FW0200	INDICATOR HOUSING(UPPER)	FW/OFW SERIES	1	
G0001OFW000	INDICATOR HOUSING(UNDER)	OFW SERIES	1	
G0003PSP000	INDICATOR FIX PLATE	PSP/OFW SEIES, U SHAPE	1	
F0004OBW000	STEEL PILLAR(COATING)	OBW SERIES, L SHAPE	1	PD-B
F0004OFW000	STEEL PILLAR(COATING)	OFW SERIES, L SHAPE	1	PD-F,L,XL
G0004EC0001	ADJUSTABLE FEET	E SERIES	2	INDICATOR
A1600060400	RECHARGEABLE BATTERY	GP4-6/6V 4Ah	1	
A1208020351	BATTERY WIRE ARRAY	2 PIN 35cm(SINGLE HOUSING)	1	
F0007NBS102	S/S BATTERY CLAMP	NBS SERIES	1	
C1W10000000	PANEL PC	200*78*2t(TRANSPARENT)	1	
C1PD0030000	OVERLAY PC	PD SERIES	1	
Z7MFW000000	DUST COVER	MFW SERIES	1	
A0906000210	D.C. JACK	SCD-021	1	
A60********	ADAPTOR	***V/9V 500mA	1	
A0905600401	CONNECTOR	PLT-164-P	1	
A0905600400	CONNECTOR	PLT-164-R	1	
A1204040250	WIRE ARRAY	4 PIN 25cm	1	
G0005NBS000	RUBBER WASHER	ψ 27xψ 9x3mm	2	

1706S-10-X MAINBOARD

E0706000010	P.C.B.	1706S-10-X	1	
A0208072250	I.C.	UPD7225G	1	U1
A0202093461	I.C.	93C46	1	U4
A0203071350	I.C.	7135(TI)	1	U7
A0203076600	I.C.	7660	1	U9
A0204744520	I.C.	74HC4520AP	1	U6
A0206000074	I.C.	OP07CP(AD)	2	U3,5
A0206003580	I.C.	LM358N	1	U8
A0201089521	I.C.	89C52	1	U2
A0102000281	L.C.D.	UTN-G281JV-W	1	LCD1
A0300000040	I.C. SOCKET	40 PIN	1	U2
A0401007330	TRANSISTOR	A733	2	Q7,9
A0401009450	TRANSISTOR	2SC945	3	Q3,4,8
A0401015150	TRANSISTOR	A1515	2	Q2,5
A0401010610	TRANSISTOR	C1061C OR D880	1	Q6
A0501004148	DIODE	1N4148	2	D1,2
A0502000001	BRIDGE RECTIFIER	W04(1A)	1	BR1
A0503020033	ZENER DIODE	1/2W 3V3(3C2)	1	ZD2
A0503020082	ZENER DIODE	1/2W 8V2(9A3)	1	ZD1
A0625050000	L.E.D.	ROUND,5mm,(RED,GREEN)	1	LED1
A0701106017	CAPACITOR (EC)	10uF/16V (SS TYPE)	6	C20,22-24 35-36
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C17
A0701477016	CAPACITOR (EC)	470uF/16V	1	C19
A0702105035	CAPACITOR (TC)	1uF/35V(105L)	1	C37
A0702106016	CAPACITOR (TC)	10uF/16V(106F)	2	C15,21
A0713105063	POLYESTER FILM CAPACITOR(MEF)	1uF/63V(105)	3	C11-13
A0713224101	POLYESTER FILM CAPACITOR(MEF)	0.22uF/100V(224)	2	C9,10
A0710224101	POLYESTER FILM CAPACITOR(MPP)	0.22uF/100V(224)	1	C14
A0720103101	POLYESTER FILM CAPACITOR(PEI)	0.01uF/100V(103J)	1	C8

A0730104050	CAPACITOR (MLC)	104Z	21	C1-7,16, 18,25-30 32,38-42
A0740020050	CERAMIC CAPACITOR (CC)	20pF	2	C33,34
A0801001203	TRIMMER	3006P-001-203(20K)	1	VR1
A0802047309	RESISTOR NETWORK	47K OHM 9 PIN	1	NR1
A0803042002	METAL FILM RESISTOR(10PPM)	20K OHM 1/4W	1	R10
A0803042201	METAL FILM RESISTOR(10PPM)	2.2K OHM 1/4W	1	R9
A0804041003	METAL FILM RESISTOR	100K OHM 1/4W	6	R2~6
A0804041503	METAL FILM RESISTOR	150K OHM 1/4W	1	R39
A0804045003	METAL FILM RESISTOR	500K OHM 1/4W	1	R40
A0804046802	METAL FILM RESISTOR	68K OHM 1/4W	1	R3
A5005000110	JUMPER		1	R8
A0805020120	CARBON FILE RESISTOR	1.2 OHM 1/2W	1	R14
A0805021101	CARBON FILE RESISTOR	100 OHM 1/2W	1	R12
A0805041102	CARBON FILM RESISTOR	1K OHM 1/4W	2	R22,31
A0805041103	CARBON FILM RESISTOR	10K OHM 1/4W	6	R17,24,30 ,34-36
A0805041104	CARBON FILM RESISTOR	100K OHM 1/4W	1	R20
A0805041153	CARBON FILE RESISTOR	15K OHM 1/4W	1	R15
A0805041183	CARBON FILE RESISTOR	18K OHM 1/4W	1	R37
A0805041221	CARBON FILE RESISTOR	220 OHM 1/4W	2	R13,23
A0805041223	CARBON FILE RESISTOR	22K OHM 1/4W	2	R21,41
A0805041334	CARBON FILM RESISTOR	330K OHM 1/4W	1	R33
A0805041471	CARBON FILE RESISTOR	470 OHM 1/4W	1	R16
A0805041472	CARBON FILE RESISTOR	4.7K OHM 1/4W	7	R18,19,25 ,26,32,38 ,42
A0902010020	CONNECTOR	2 PIN WAFER,PITCH=3.9mm	2	J1,2
A1100273728	CRYSTAL	7.3728 MHz	1	X1
A1301000002	DIP S/W	DS-02 (4 PIN)	1	DIP1
A1306000003	TACT SW	KPT-1104B	4	SW1~4
A1500000004	BUZZER	OBO-15210	1	BZ1
A5004000002	HEAT SINK	MB-204-20	1	Q6
Z0011000308	SCREW(FLAT HEAD)	M3*8	1	Q6
Z0016000003	NUT	M3	1	Q6

EL BACKLIGHT OPTION

A0401009450	TRANSISTOR	2SC945	1	Q1
A0805041102	CARBON FILM RESISTOR	1K OHM 1/4W	1	R28
A0805041334	CARBON FILM RESISTOR	330K OHM 1/4W	1	R29
A1400000004	BACKLIGHT(EL)	103.5*40mm(BL-8036)	1	EL1
A1401005000	INVERTER	5V/90cm^2	1	IN1

==

7. APPENDIX

AT89C52

8-Bit Microcontroller with 8 Kbytes Flash

Features

- Compatible with MCS-51™ Products
- 8 Kbytes of In-System Reprogrammable Flash Memory
  Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 256 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-Bit Timer/Counters
- Eight Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down Modes

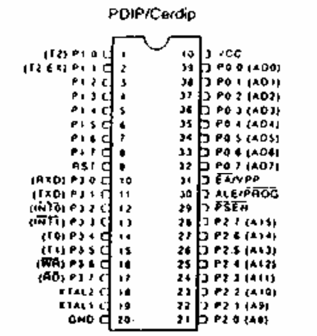
Description

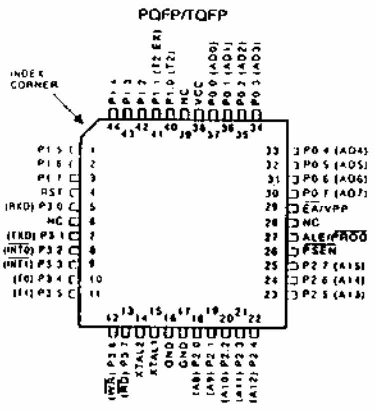
The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8 Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard 80C51 and 80C52 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

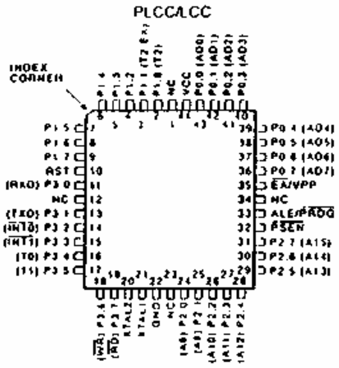
The AT89C52 provides the following standard features: 8 Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C52 is

(continued)

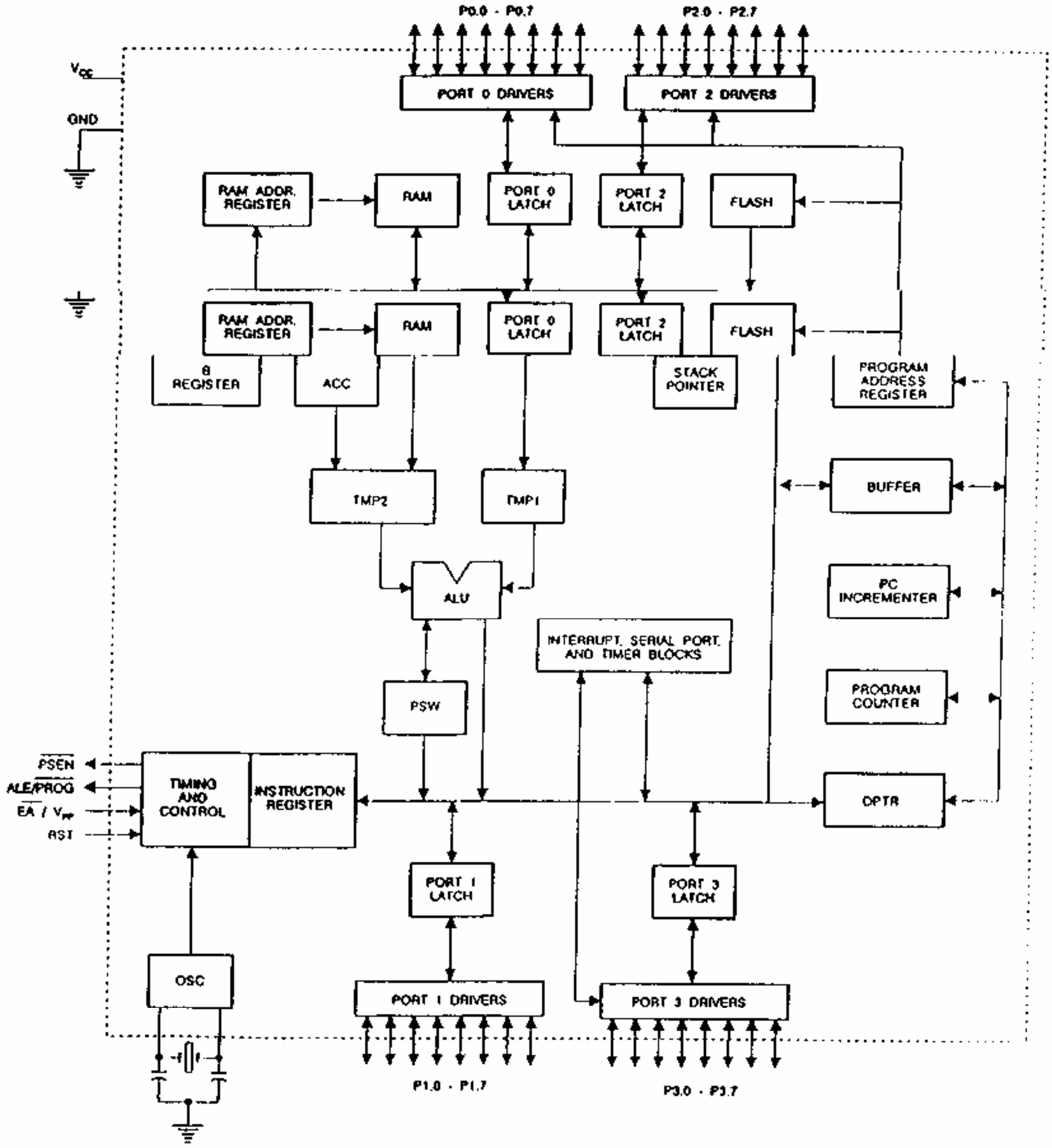
Pin Configurations







Block Diagram



Data Sheet | December 2000 | File Number 3093.2

$4^{1}/_{2}$ Digit, BCD Output, A/D Converter

The Intersil ICL7135 precision A/D converter, with its multiplexed BCD output and digit drivers, combines dual-slope conversion reliability with 1 in 20,000 count accuracy and is ideally suited for the visual display DVM/DPM market. The 2.0000V full scale capability, auto-zero, and auto-polarity are combined with true ratiometric operation, almost ideal differential linearity and true differential input. All necessary active devices are contained on a single CMOS IC, with the exception of display drivers, reference, and a clock.

The ICL7135 brings together an unprecedented combination of high accuracy, versatility, and true economy. It features auto-zero to less than 10 V, zero drift of less than 1 V/^{o}C, input bias current of 10pA (Max), and rollover error of less than one count. The versatility of multiplexed BCD outputs is increased by the addition of several pins which allow it to operate in more sophisticated systems These include STROBE, OVERRANGE, UNDERRANGE, RUN/HOLD and BUSY lines, making it possible to interface the circuit to a microprocessor or UART.

Features

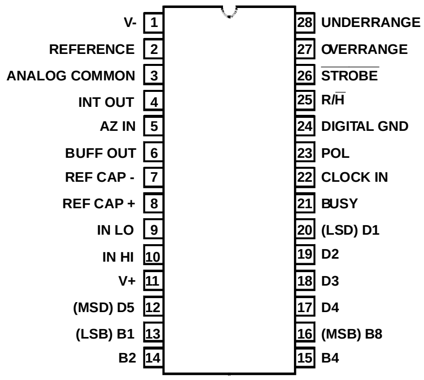
- Accuracy Guaranteed to 1 Count Over Entire 20000 Counts (2.0000V Full Scale)
- Guaranteed Zero Reading for 0V Input
- 1pA Typical Input Leakage Current
- True Differential Input
- True Polarity at Zero Count for Precise Null Detection
- Single Reference Voltage Required
- Overrange and Underrange Signals Available for Auto-Range Capability
- All Outputs TTL Compatible
- Blinking Outputs Gives Visual Indication of Overrange
- Six Auxiliary Inputs/Outputs are Available for Interfacing to UARTs, Microprocessors or Other Circuitry
- Multiplexed BCD Outputs

Ordering Information

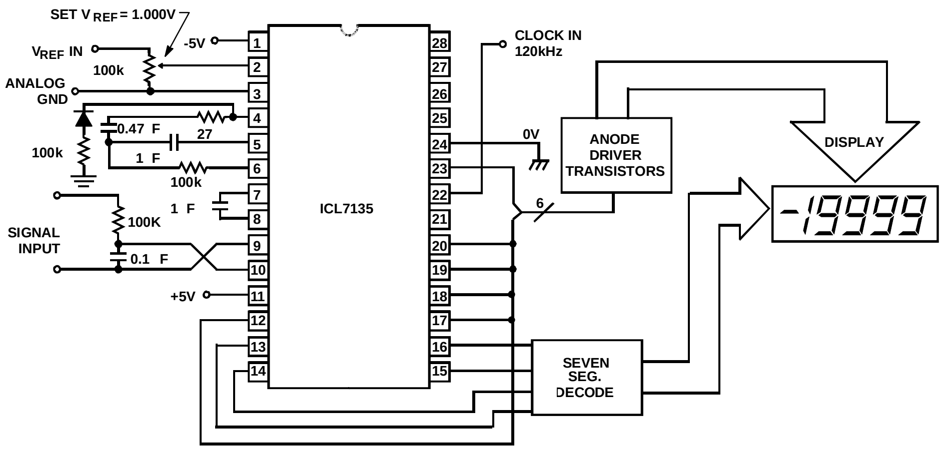
PART NUMBER	TEMP. RANGE (^{o}C)	PACKAGE	PKG. NO.
ICL7135CPI	0 to 70	28 Ld PDIP	E28.6

Pinout

ICL7135
(PDIP)
TOP VIEW



Typical Application Schematic



μPD7225
CMOS, Intelligent, Alphanumeric LCD Controller/Driver

Description

The μPD7225 is an intelligent peripheral device designed to interface most microprocessors with a wide variety of alphanumeric LCDs. It can directly drive any static or multiplexed LCD containing up to 4 backplanes and up to 32 segments and is easily cascaded for larger LCD applications. The μPD7225 communicates with a host microprocessor through an 8-bit serial interface. It includes a 7-segment numeric and a 14-segment alphanumeric segment decoder to reduce system software requirements. The μPD7225 is manufactured with a low power consumption CMOS process allowing use of a single power supply between 2.7 V and 5.5 V. It is available in a space-saving 52-pin plastic flat package.

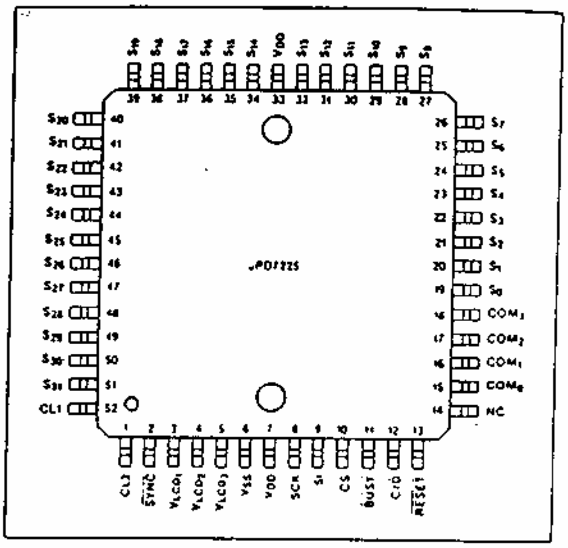
Features

- Single chip LCD controller with direct LCD drive
- Low cost serial interface to most microprocessors
- Compatible with
  - 7-segment numeric LCD configurations up to 16 digits
  - 14-segment alphanumeric LCD configurations up to 8 characters
- Selectable LCD drive configuration:
  - Static, biplexed, triplexed, or quadruplexed
- 32-segment drivers
- Cascadable for larger LCD applications
- Selectable LCD bias voltage configuration:
  - Static, 1/2 or 1/3
- Hardware logic blocks reduce system software requirements
  - 8-bit serial interface
  - Two 32 × 4-bit static RAMs for display data and blinking data storage
  - Programmable segment decoding capability:
    - 16-character, 7-segment numeric decoder
    - 64-character, 14-segment USASCII alphanumeric decoder
  - Programmable segment blinking capability
  - Automatic synchronization of segment drivers with sequentially multiplexed backplane drivers
- Single power supply, variable from 2.7 V to 5.5 V
- Low power consumption CMOS technology
- Extended −40°C to +85°C temperature range available

Ordering Information

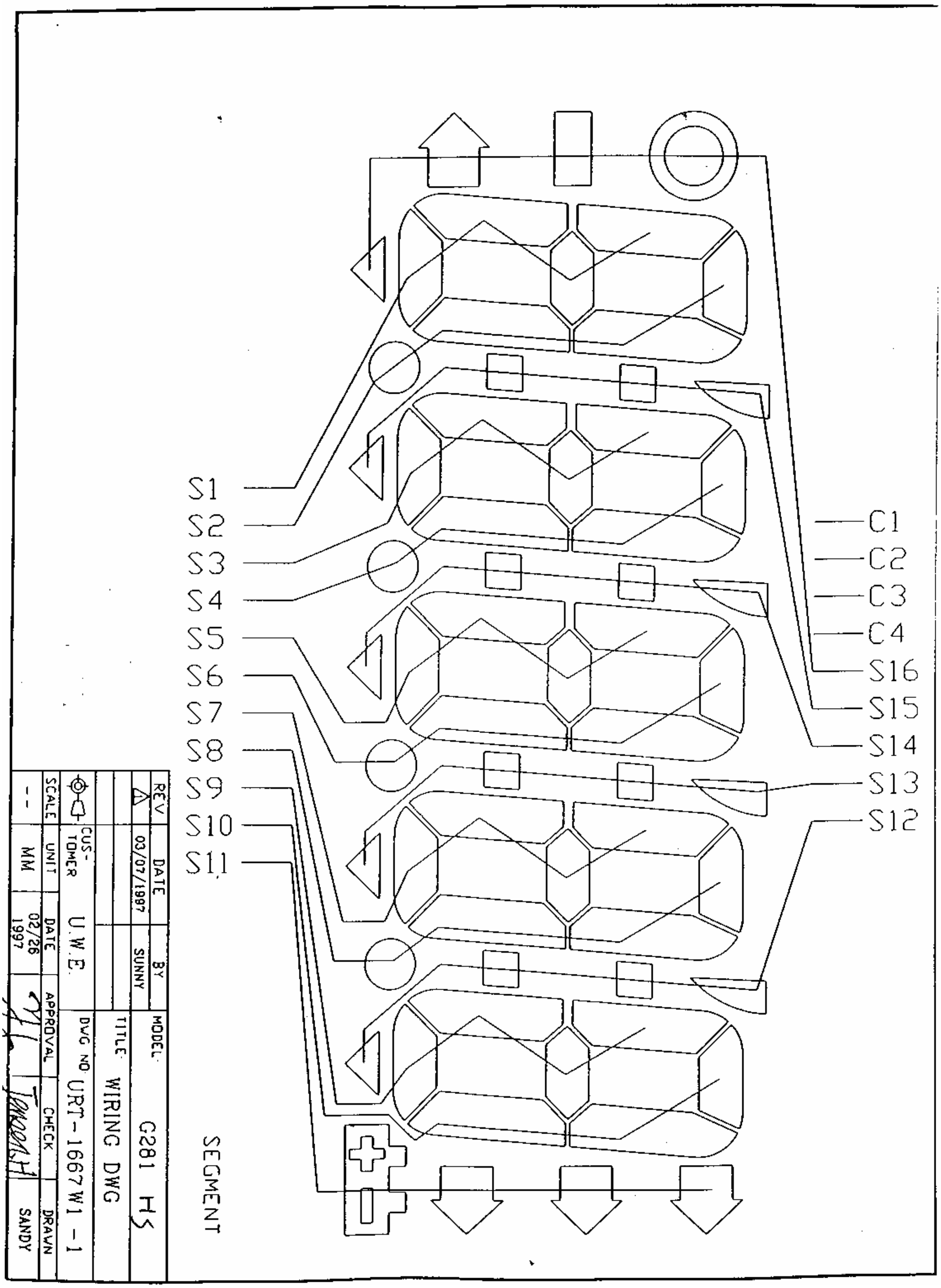
Part Number	Package Type	Max Frequency of Operation
μPD7225G-00	52-pin plastic miniflat	1 MHz

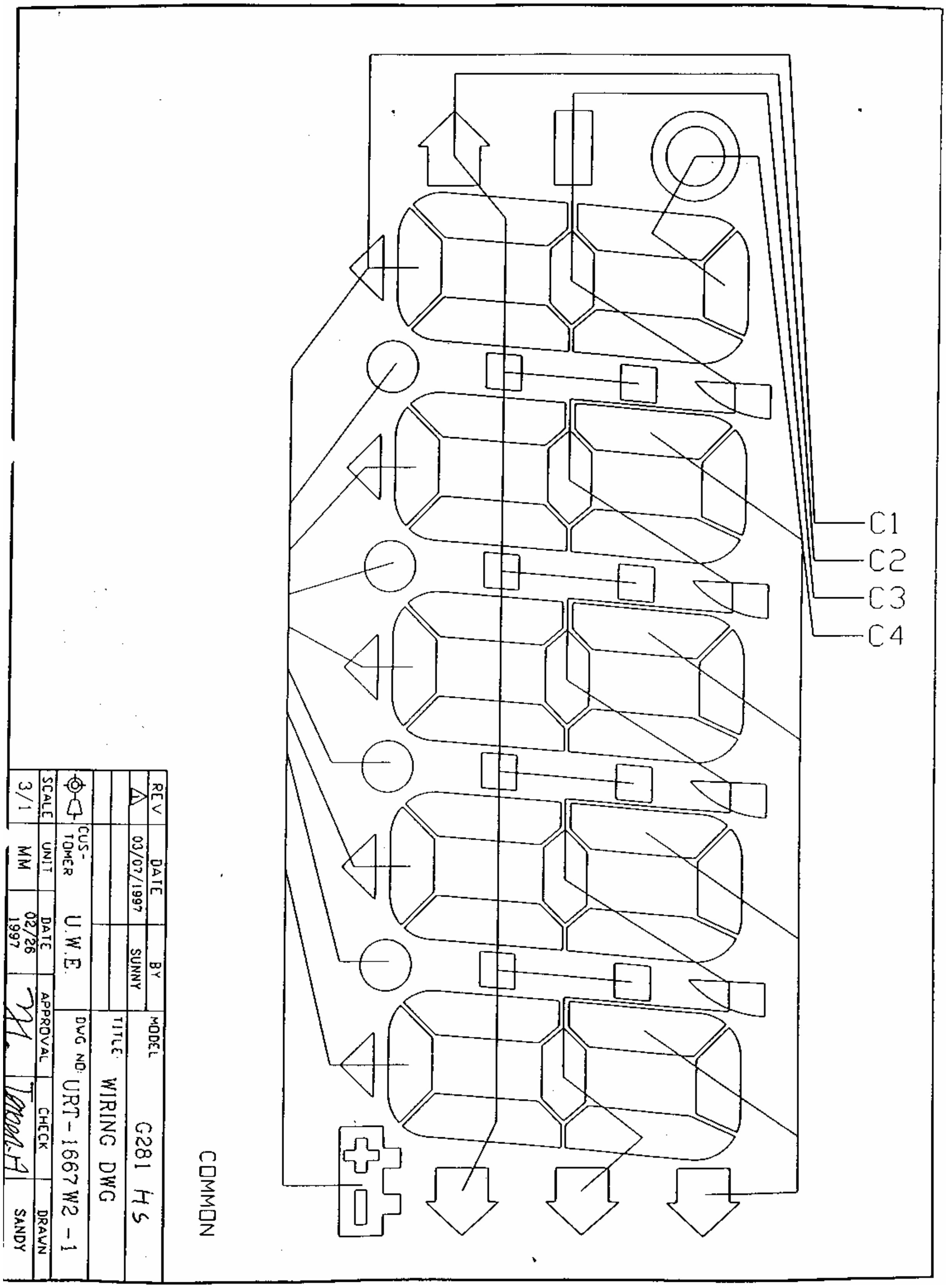
Pin Configuration

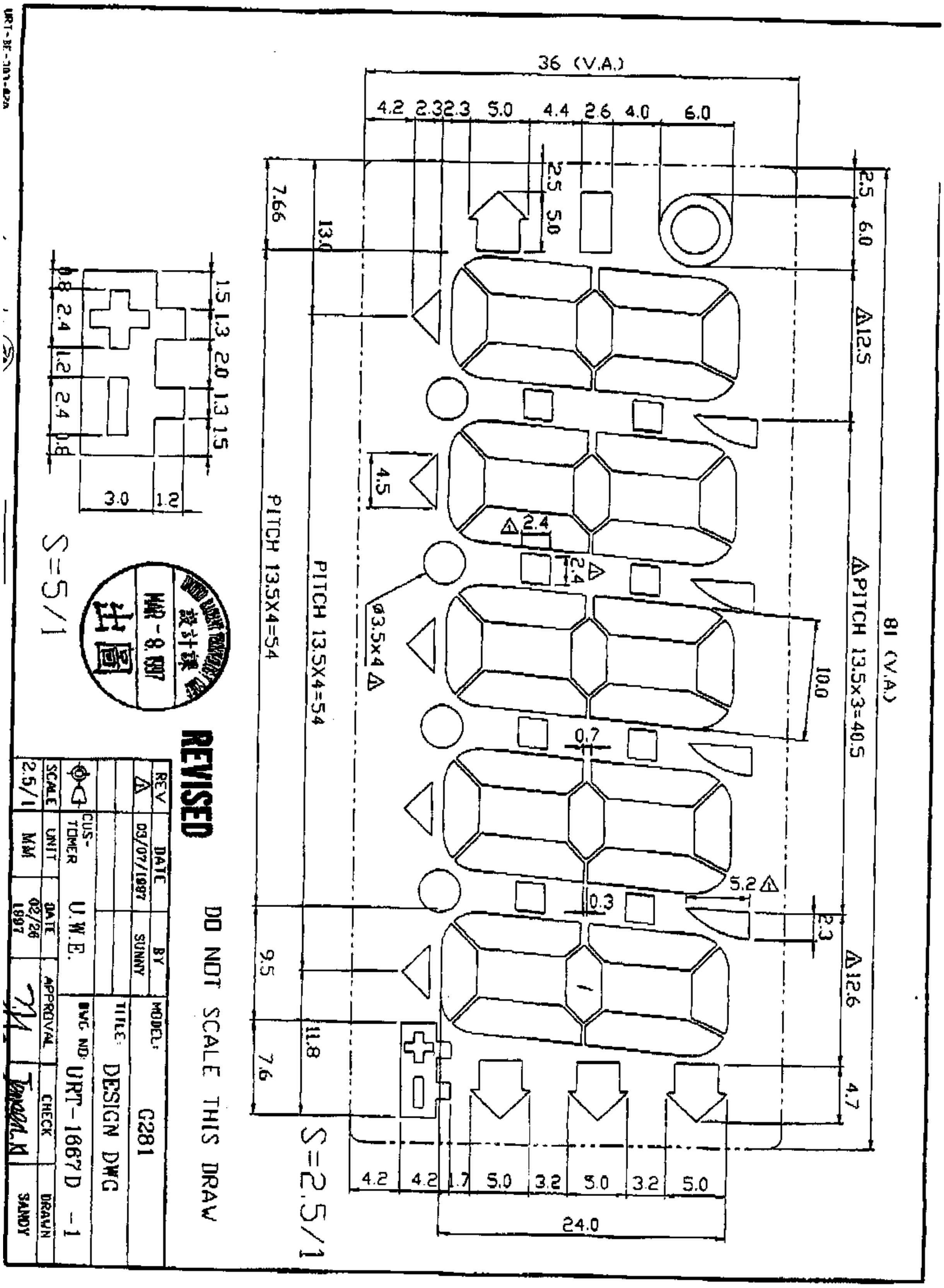


Pin Identification

No.	Symbol	Function
1	CL2	System clock output
2	$\overline{SYNC}$	Synchronization port
3-5	V_{LCD1}-V_{LCD3}	LCD bias voltage supply inputs
6	V_{SS}	Ground
7, 33	V_{DD}	Power
8	$\overline{SCK}$	Serial clock input
9	SI	Serial input
10	$\overline{CS}$	Chip select
11	$\overline{BUSY}$	Busy output
12	$C/\overline{D}$	Command or data select input
13	$\overline{RESET}$	Reset input
14	NC	No connection
15-18	COM_0-COM_3	LCD backplane driver outputs
19-32, 34-51	S_0-S_{31}	LCD segment driver outputs
52	CL1	System clock input


S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
C1
C2
C3
C4
S16
S15
S14
S13
S12
SEGMENT
REV
DATE
BY
03/07/1997
SUNNY
MODEL
G281 HS
TITLE
WIRING DWG
CUS-TOMER
U.W.E.
DWG NO
URT-1667W1-1
SCALE
UNIT
DATE
APPROVAL
CHECK
DRAWN
- -
MM
02/26 1997
SANDY


C1
C2
C3
C4
COMMON
REV
DATE
BY
MODEL
G281 HS
03/07/1997
SUNNY
TITLE
WIRING DWG
CUS-TOMER
U.W.E.
DWG NO:
URT-1667W2-1
SCALE
UNIT
DATE
APPROVAL
CHECK
DRAWN
3/1
MM
02/26 1997
SANDY


36 (V.A.)
81 (V.A.)
PITCH 13.5X4=54
ΔPITCH 13.5x3=40.5
ø3.5x4 Δ
S=5/1
S=2.5/1
REVISED
DO NOT SCALE THIS DRAW
REV
DATE
BY
MODEL: G281
03/07/1997
SUNNY
TITLE: DESIGN DWG
CUSTOMER U.W.E.
DWG NO: URT-1667D -1
SCALE 2.5/1
UNIT MM
DATE 02/26 1997
APPROVAL
CHECK
DRAWN SANDY